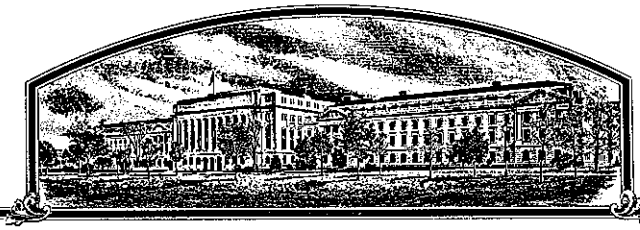
No. 8000101



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

E. F. Burlingham and Sons

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

PERENNIAL RYEGRASS

'Belle'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 27th *day of* February *in the year of our Lord one thousand nine hundred and* eighty-four.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

John R Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
BURLINGHAM MP-1	BELLE	PV NUMBER 8000101
2. KIND NAME: PERENNIAL RYEGRASS	3. GENUS AND SPECIES NAME: LOLIUM PERENNE L.	FILING DATE 5/5/80 — TIME 8:00 A.M. P.M.
4. FAMILY NAME (BOTANICAL): GRAMINEAE	5. DATE OF DETERMINATION: AUGUST 30, 1977	FEE RECEIVED $ 500.00 $ 250.00 — DATE 5/5/80 1/13/84

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
E.F.BURLINGHAM AND SONS	P. O. BOX 217 FOREST GROVE, OREGON 97116	(503)357-2141

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
CORPORATION	OREGON - APRIL 27, 1950	4-27-50

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:
MR. ROBERT J. PETERSON, E.F. BURLINGHAM AND SONS, P.O. BOX 217, FOREST GROVE, OREGON 97116

13. **CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:**

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [X] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED?
[X] YES [ ] NO	[X] FOUNDATION [ ] REGISTERED [X] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [X] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

March 26, 1980
(DATE)

E. F. BURLINGHAM & SONS
VICE PRESIDENT Robert J. Peterson
(SIGNATURE OF APPLICANT)

1

(DATE)

(SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and $500 fee ($250 filing fee and $250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.

13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.

13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.

14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)

15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

EXHIBIT A

Origin and Breeding History of Belle Perennial Ryegrass

1. Belle perennial ryegrass is an advanced generation synthetic cultivar derived from the progenies of 81 clones. Attractive, disease resistant, early maturing plants were selected from eight different perennial ryegrass cultivars and breeding composites. Progenies from intercrosses of these plants were screened for resistance to crown rust and transplanted into spaced-plant nurseries. Polycross progenies of clones selected from these nurseries were seeded in turf trials maintained at a 2 cm cutting height. Tillers were subsequently selected from the best performing turf plots and transferred to spaced-plant nurseries. The 81 parental clones of Belle were selected from these nurseries. Selection was based on early maturity, freedom from disease and acceptable seed production. The germplasm sources used in the development of Belle perennial ryegrass are listed on table 1.

2. Syn II breeder seed of Belle perennial ryegrass was produced from an isolated, spaced-plant nursery of 2266 selected seedlings of the 81 parental clones. Seed propagation of Belle is limited to two generations of increase from breeder seed--one each of foundation and certified.

3. No ~~objectionable~~ off-type mature plants or variants have been observed in the multiplication of Belle perennial ryegrass.

8/5/81 as per letter

4. Syn II breeder seed and Syn III foundation seed have both produced turf of acceptable uniformity.

EXHIBIT A (CONT'D)

8000101

Table 1. Germplasm sources used in the development of Belle perennial ryegrass.

Source of germplasm	Percent Contribution
1. Yorktown II	24
2. Citation	23
3. Diplomat	20
4. Omega	12
5. Pennfine	8
6. H-3[1/]	8
7. L4H[2/]	4
8. Syn F[3/]	1
Total	100

[1/] H-3 is a turf-type clone obtained from the cross of a crown rust resistant plant selected from PI197,270 (Finland) with a plant selected from Diplomat.

[2/] L4H was selected from a school playground in Baltimore, Maryland.

[3/] Syn F is a late maturing synthetic derived primarily from Manhattan and Pennfine germplasm.

EXHIBIT B (Revised)

Novelty Statement on Belle Perennial Ryegrass

'Belle' perennial ryegrass is a moderately dark green, fine-textured turf-type variety which is medium early in maturity (Table 4). In replicated trials located near Hubbard, Oregon, anthesis of Belle occurred 10 days later than Regal, nine days later than Citation and Pennfine, eight days later than Derby and seven days later than Birdie. Anthesis of Belle occurred seven days earlier than Caravelle, 11 days earlier than Blazer and Yorktown II, 16 days earlier than Manhattan and 18 days earlier than Loretta.

Belle has shown very good performance in turf trials in New Jersey (Tables 1, 2 and 3) and Oregon (Table 19). It has the ability to produce a dense, fine-textured turf. In a turf trial at Adelphia, New Jersey (Table 11), Belle produced significantly more tillers per 100 square cm than many of the other ryegrasses. Belle produced 94 more tillers than Manhattan, 112 more than Player, 115 more than Regal, 147 more than Caravelle, 151 more than NK-100, 180 more than Ensporta, 189 more than NK-200, 194 more than S-101, 200 more than Sprinter, 223 more than Venlona, 225 more than S-321 and 252 more than Linn. Belle also produced narrower, finer leaves (Table 11) than Derby (.14 mm narrower), Player (.17 mm narrower), NK-100 (.19 mm narrower), Sprinter (.28 mm narrower), S-101 (.29 mm narrower), Caravelle and Ensporta (.30 mm narrower), S-321 (.33 mm narrower), Venlona (.39 mm narrower), NK-200 (.41 mm narrower) and Linn (.53 mm narrower).

Belle has shown good winter hardiness in a New Jersey turf trial (Table 13). Belle showed no winter injury whereas Citation showed 11 percent winter injury, Birdie 12 percent, Derby 14 percent, Pennfine 18 percent, Ensporta 24 percent, Venlona 28 percent, NK-100 31 percent, Linn 38 percent, Caravelle 45 percent, S-101 48 percent and S-321 63 percent.

Belle has exhibited moderately good resistance to the Rhizoctonia brown patch disease in turf trials in New Jersey (Tables 15 and 16). In a test planted August 1976 at North Brunswick, New Jersey, Belle had a Rhizoctonia brown patch disease severity rating of 6.2 (9=least disease), whereas Derby and Birdie rated 5.5, Omega and Regal rated 5.4, Pennfine rated 5.2, Manhattan 4.8, Yorktown 4.4, Idole 3.8, Score 3.4, S-321 1.9, and S-101 1.8. In a test planted August 1977 at Adelphia, New Jersey, Belle had a Rhizoctonia brown patch disease rating of 6.8 whereas Omega rated 6.0, Birdie 5.9, Pennfine 5.8, Manhattan 5.0, Loretta 4.9, Score and NK-100 3.1, Hunter 3.0, Caravelle 2.9, Sprinter 2.5, NK-200 2.1, Linn 2.0, Venlona and S-321 1.9, Ensporta 1.8 and S-101 1.7.

In Oregon turf trials (Table 18), Belle showed moderately good resistance to the winter brown blight disease incited by Drechslera spp. Belle showed only 17.2 percent damage from disease as compared to Fiesta with 24.2 percent damage, Pennfine with 25.0 percent, Linn with 26.7 percent, Citation with 35.4 percent, NK-200 with 44.2 percent and S-101 with 45.0 percent.

Belle most closely resembles Blazer, however, Belle is 11 days earlier and is 2.4 cm taller than Blazer (Tables 4 and 5).

In comparison to Fiesta, Belle was 4.0 cm shorter, had 30% purple spikes to Fiesta's 5%, and Belle was more resistant to the winter brown blight disease, having a rating of 17.2 vs. Fiesta's rating of 24.2 (Tables 5, 10 and 18).

Compared to Dasher, Belle's 2-year performance score was higher than Dasher's (6.4 vs 5.7), Belle showed 0.6 more florets per spikelet and 0.9 mm shorter glumes, and Belle is moderately dark green whereas Dasher is a medium green color (Tables 2 and 8).

The Pacific Northwest's Grass
Breeding and Evaluation Center
Pure Seed Testing, Inc.

April 15, 1982

Mr. Bob Peterson
E.F. Burlingham & Sons
P. O. Box 217
Forest Grove, OR 97116

Dear Bob:

We have 2 years data on flowering comparisions on Belle and Blazer:

	10% Anthesis	
	1978	1980
Blazer	6/15	6/14
Belle	6/4	6/6

This flowering data comes from two different replicated trials near Hubbard, OR. The 1978 data was from a trial seeded in 1977 and the 1980 data was from a trial seeded in 1979.

I hope this information is useful to you.

Sincerely,

Bill Meyer

William A. Meyer, Ph.D.
President

WAM/dg

73 West G Street · PO Box 449 · Hubbard, Oregon 97032
503/981-SEED · TWX 510 590 0957

Hubbard Oregon
4 rows 6' long
Replicated Yield Trial
Seeded Oct 1982

1983
50%
Heading date

Variety	
Citation	5/19
Pennfine	5/19
Omega	5/27
Belle	5/25
Blazer	5/31
Manhattan	6/11

In comparison to Omega, Belle's 2-year performance score was higher than Omega's (6.4 vs. 5.6). Belle had 1.4 more florets per spikelet, and Belle was more resistant to winter brown blight disease, having a rating of 6.2 whereas Omega's rating was 5.4 in 1976 and in 1977, Belle's rating was 6.8 and Omega's 6.0 (Tables 2, 8, 15, 16).

In comparison to Derby, Belle's average turf performance score was 7.0 whereas Derby's was 6.0, Belle was 8 days later, was 8.5 cm shorter, had 1.2 more florets per spikelet, a higher percentage of purple spikes than Derby, and Belle produced 85 more tillers per 100 square cm and had 0.14 mm narrower leaves than Derby. Belle's resistance to Rhizoctonia brown patch disease is higher, having a disease rating of 6.2 vs. Derby's 5.5 in 1976 and 6.8 vs. 6.2 in 1977 (Tables 1, 4, 5, 8, 10, 11, 15, and 16).

EXHIBIT B (CONT'D)

8000101

Table 4. Maturity ratings of perennial ryegrass cultivars and selections near Hubbard, Oregon during 1978.

	Cultivar or selection	Date of initial 10% anthesis
1.	Regal	May 25
2.	Citation	May 26
3.	Pennfine	May 26
4.	Derby	May 27
5.	Birdie	May 28
6.	Fiesta	June 2
7.	Dasher	June 3
8.	Belle	June 4
9.	Omega	June 4
10.	Caravelle	June 11
11.	Blazer	June 15
12.	Yorktown II	June 15
13.	Manhattan	June 20
14.	Loretta	June 22
	LSD .05	2.5 days

EXHIBIT B (CONT'D)

Table 5. Mature plant height and spike length measurements of perennial ryegrass cultivars and selections grown near Hubbard, Oregon during 1978.

Cultivar or selection	Mature plant height cm	Mature plant height SE	Spike length cm	Spike length SE
1. Derby	87.7	0.81	23.3	0.46
2. Birdie	85.5	0.80	25.5	0.46
3. Pennfine	85.0	0.81	23.5	0.44
4. Fiesta	83.2	0.67	22.5	0.50
5. Dasher	81.1	0.56	23.3	0.49
6. Omega	80.1	0.52	22.0	0.32
7. Belle	79.2	0.57	22.1	0.40
8. Manhattan	78.4	0.76	24.6	0.34
9. Blazer	76.8	0.63	22.3	0.40
10. Loretta	76.2	0.84	20.7	0.44
11. Citation	75.2	0.76	22.9	0.41
12. Yorktown II	71.4	0.70	21.7	0.38
13. Regal	69.5	0.70	21.2	0.53
14. Caravelle	62.3	0.48	17.6	0.45

EXHIBIT B (CONT'D)

8000101

Table 6. Comparison of perennial ryegrass cultivars and selections for flag leaf length and flag leaf width in test grown near Hubbard, Oregon during 1978.

Cultivar or selection	Flag leaf length cm	SE	Flag leaf width mm	SE
1. Birdie	19.7	0.39	6.4	0.18
2. Pennfine	18.7	0.44	6.7	0.19
3. Derby	18.6	0.41	6.4	0.21
4. Omega	18.6	0.45	5.9	0.18
5. Fiesta	18.4	0.36	5.7	0.17
6. Manhattan	18.2	0.50	5.9	0.21
7. Blazer	18.0	0.36	5.9	0.17
8. Yorktown II	18.0	0.38	4.9	0.14
9. Dasher	17.8	0.35	5.9	0.18
10. Belle	17.7	0.35	6.0	0.16
11. Loretta	17.1	0.53	6.5	0.23
12. Regal	16.8	0.45	6.3	0.19
13. Caravelle	16.6	0.43	5.9	0.17
14. Citation	16.3	0.41	6.2	0.22

EXHIBIT B (CONT'D)

8000101

Table 12. Seed characteristics of perennial ryegrass cultivars and selections.

Cultivar or selection	Seed weight mg. per 1000 seeds	Total width of 10 seeds mm.	Total length of 10 seeds mm
1. NK200	2,205	13.3	57.4
2. Linn	2,093	13.2	60.2
3. Pennfine	1,842	12.2	50.9
4. Dasher	1,798	12.1	53.5
5. Manhattan	1,796	11.5	50.6
6. Belle	1,510	12.3	52.4
7. Derby	1,502	11.6	51.4
8. Fiesta	1,306	13.0	55.7
9. Blazer	1,200	12.6	56.1
10. Loretta	1,109	10.3	42.0
LSD .05	42	0.8	3.6

Only one seed lot of each entry was examined.

EXHIBIT B (CONT'D)

8000101

Table 13. Percent winter injury of perennial ryegrass cultivars and selections in test seeded August 30, 1977 at Adelphia, New Jersey.

Cultivar or selection	Percent winter injury March 30, 1978
1. Blazer	0
2. Yorktown II	0
3. Belle	0
4. Fiesta	0
5. Diplomat	0
6. Dasher	0
7. Omega	0
8. Regal	0
9. Manhattan	0
10. Score	4
11. NK200	4
12. Loretta	5
13. Hunter	8
14. Sprinter	8
15. Citation	11
16. Birdie	12
17. Derby	14
18. Pennfine	18
19. Ensporta	24
20. Venlona	28
21. NK100	31
22. Linn	38
23. Caravelle	45
24. S-101	48
25. S-321	63
LSD at 5%	7.3

EXHIBIT B (CONT'D)

8000101

TABLE 14. Reaction of perennial ryegrass cultivars and selections to the Rhizoctonia brown patch disease in turf trials established August 1974 at North Brunswick, New Jersey.

	Cultivar or Selection	Rhizoctonia* Brown patch disease rating
1.	Citation	6.6
2.	Yorktown II	6.4
3.	Blazer	6.2
4.	Fiesta	6.1
5.	Diplomat	6.0
6.	Birdie	6.0
7.	Dasher	5.8
8.	Omega	5.8
9.	Pennfine	5.8
10.	Derby	5.7
11.	Manhattan	5.0
12.	Yorktown	4.9
13.	NK 200	3.2
14.	Sprinter	3.2
15.	S-321	3.0
16.	Eton	2.9
17.	Servo	2.9
18.	Linn	2.7
19.	Pelo	2.5
20.	Sportiva	2.4
21.	Caprice	2.3
22.	NK 100	2.3
23.	Ensporta	2.2
24.	Game	2.2
25.	Endura	2.1
26.	Compas	2.0
27.	Splendor	2.0
28.	Combi	1.8
29.	Perma	1.7
	LSD .05	0.5

*Disease incited by Rhizoctonia solani. Ratings taken August 9, 1976.

EXHIBIT B (CONT'D)

Table 15. Reaction of perennial ryegrass cultivars and selections to the Rhizoctonia brown patch disease in turf trials established August 1976 at North Brunswick, New Jersey.

Cultivar of Selection		Rhizoctonia brown patch disease rating 9 = least disease
1.	Blazer	6.6
2.	Yorktown II	6.5
3.	Fiesta	6.5
4.	Citation	6.4
5.	Belle	6.2
6.	Dasher	5.8
7.	Diplomat	5.7
8.	Derby	5.5
9.	Birdie	5.5
10.	Omega	5.4
11.	Regal	5.4
12.	Pennfine	5.2
13.	Manhattan	4.8
14.	Yorktown	4.4
15.	Idole	3.8
16.	Score	3.4
17.	S-321	1.9
18.	S-101	1.8
	LSD .05	0.6

*Disease incited by Rhizoctonia solani. Ratings taken August 22, 1977.

EXHIBIT B (CONT'D)

8000101

Table 16. Reaction of perennial ryegrass cultivars and selections to Rhizoctonia brown patch disease in test planted August 30, 1977 at Adelphia, New Jersey.

Cultivar or selection	Disease rating* 9 = least damage
1. Blazer	7.4
2. Yorktown II	7.0
3. Fiesta	7.0
4. Citation	7.0
5. Dasher	6.9
6. Belle	6.8
7. Diplomat	6.6
8. Regal	6.3
9. Derby	6.2
10. Omega	6.0
11. Birdie	5.9
12. Pennfine	5.8
13. Manhattan	5.0
14. Loretta	4.9
15. Score	3.1
16. NK100	3.1
17. Hunter	3.0
18. Caravelle	2.9
19. Sprinter	2.5
20. NK200	2.1
21. Linn	2.0
22. Venlona	1.9
23. S-321	1.9
24. Ensporta	1.8
25. S-101	1.7
LSD at 5%	0.6

*Ratings obtained August 25, 1978.

EXHIBIT B (CONT'D)

8000101

Table 18. Brown blight ratings of perennial ryegrass cultivars and selections in turf trials at Hubbard, Oregon.

Cultivar or selection	Brown blight* percent damage Dec. 16 1977	Feb. 3 1978	Avg.
1. S-101	45.0	45.0	45.0
2. NK-200	40.0	48.3	44.2
3. Citation	36.6	34.2	35.4
4. Linn	25.0	28.3	26.7
5. Pennfine	22.7	29.2	25.0
6. Fiesta	25.0	23.3	24.2
7. Birdie	21.0	23.3	22.2
8. Loretta	17.5	25.0	21.3
9. Derby	19.3	20.0	19.7
10. Dasher	15.7	22.3	19.0
11. Manhattan	18.3	17.8	18.1
12. Regal	18.3	16.0	17.2
13. Belle	16.0	18.3	17.2
14. Pelo	13.0	18.3	15.7
15. Omega	14.5	16.5	15.5
16. Caravelle	13.0	15.7	14.4
17. Yorktown II	11.7	15.7	13.7
18. Blazer	10.0	13.3	11.7
LSD at 5%			5.4

*Brown blight incited by Helminthosporium siccans

EXHIBIT B (CONT'D)

Table 20. Reaction of perennial ryegrass cultivars and selections to crown rust in turf trials near Hubbard, Oregon.

Cultivar or selection	Percent crown rust October 3, 1978
1. Loretta	0.0
2. Yorktown II	0.7
3. Birdie	1.0
4. Blazer	1.3
5. Belle	3.7
6. Dasher	3.7
7. Fiesta	4.0
8. Pelo	4.0
9. S-101	5.0
10. Caravelle	10.0
11. Pennfine	13.0
12. Linn	14.0
13. Citation	15.8
14. Omega	16.0
15. Manhattan	16.4
16. Derby	23.3
17. Regal	28.3
18. NK-200	35.0
LSD at 5%	---

*Crown rust incited by Puccinia coronata

ADDENDUM TO EXHIBIT B (REVISED) (SUBMITTED WITH LETTER OF FEBRUARY 23, 1982):

The data on date of Anthesis, mature plant height, spike length, flag leaf length, flag leaf width, number of florets per spikelet and glume length were obtained from a replicated, randomized, seed yield trial grown near Hubbard, Oregon. The data presented are the means of 120 measurements (60 measurements in each of two replications). Statistical significance of the differences in mature plant height can be demonstrated by the use of the standard errors on the means presented in table 5. The standard error of a mean (SE or $s_{\bar{x}}$) is a very good statistic for comparing means. It is considered more useful and more conservative than the LSD value frequently used for this purpose. In table 5, Belle is shown as having a mature plant height of 79.2 cm with the standard error of the mean being 0.57 cm. The 0.95 fiducial interval would be $79.2 \pm t\ .05\ s_{\bar{x}} = 79.2 \pm 1.98\ (0.57) = 79.2 \pm 1.13 =$ 78.1 to 80.3. Fiesta is shown in table 5 as having a mature plant height of 83.2 cm with the standard error of the mean being 0.67 cm. The 0.95 fiducial interval would be 81.9 to 84.5. The fiducial intervals for Belle and Fiesta do not overlap. Similar calculations show that Belle is significantly shorter than Pennfine, Birdie, and Derby. Blazer is shown in table 5 as having a mature plant height of 76.8 cm with the standard error of the mean being 0.63 cm. The 0.95 fiducial interval would be 75.6 to 78.0. The fiducial intervals of Belle and Blazer do not overlap. Similar calculations show that Belle is significantly taller than Loretta, Citation, Yorktown II, Regal, and Caravelle.

FORM APPROVED: OMB NO. 40-R3712

FORM GR-470-36
(9-76)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

OBJECTIVE DESCRIPTION OF CULTIVARS
RYEGRASS
(Lolium spp.)

NAME OF APPLICANT(S)	VARIETY NAME OR TEMPORARY DESIGNATION
E. F. BURLINGHAM AND SONS	BELLE
ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code)*	FOR OFFICIAL USE ONLY
P.O.BOX 217, FOREST GROVE, OREGON 97116	PVPO NUMBER 8000101

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in first box (e.g. [0][8][9] or [0][9])when number if either 99 or less or 9 or less. Descriptions of characters should represent those that are typical for the variety. Ranges may be given also. Measured data should be for SPACED PLANTS. Give additional description for all characteristics that cannot be adequately described in the form below. Append all petrinent comparative trial and evaluation data.

1. SPECIES:

[2] 1 = L. MULTIFLORUM (annual or Italian: includes Westerwoldicum) 2 = L. PERENNE (perennial) 3 = L. RIGIDUM (includes Wimmera)
4 = HYBRID (of species) _____ 5 = OTHER *(Specify)* _____

2. PLOIDY:

[1] 1 = DIPLOID 2 = TETRAPLOID 3 = OTHER *(Specify)* _____

3. DURATION:

[3] 1 = ANNUAL OR BIENNIAL 2 = SHORT LIVED PERENNIAL (3-4 years) 3 = PERENNIAL (more than 4 years)

STANDARD CULTIVARS

1 = GULF 2 = WIMMERA 62 3 = LINN 4 = PELO
5 = NORLEA 6 = ABERYSTWYTH S-23 7 = MANHATTAN 8 = PENNFINE

4. MATURITY (50% HEADED) Use standards from above for comparison:

[4] 1 = VERY EARLY 3 = EARLY 5 = MEDIUM 7 = LATE 9 = VERY LATE

[16] DAYS EARLIER THAN . . . . . [7] STANDARD CULTIVAR
[09] DAYS LATER THAN . . . . . [8] STANDARD CULTIVAR

5. MATURE PLANT HEIGHT (Use standard cultivars from above) :

[79.2] CM. HIGH
[5.8] CM. SHORTER THAN . . . . . [8] STANDARD CULTIVAR
[0.8] CM. TALLER THAN . . . . . [7] STANDARD CULTIVAR

6. PERCENT WINTER DAMAGE (estimated as percent of the area appearing dead). Use standard cultivars from above for comparison:

[0] PERCENT DAMAGE OF APPLICATION CULTIVAR
[ ] PERCENT DAMAGE OF . . . . . [ ] STANDARD CULTIVAR

7. TURF DENSITY Use standard cultivars from above:

[531] TILLERS PER 100 SQ. CM.
[ ] LESS TILLERS PER 100 SQ. CM. THAN . . . . [ ] STANDARD CULTIVAR
[84] MORE TILLERS PER 100 SQ. CM. THAN . . . [8] STANDARD CULTIVAR

8. FLAG LEAF (at full growth) Use standard cultivars from above:

[17.7] CM. LENGTH (from ligule to tip)
[6.0] MM. WIDTH (at widest point)
[0.5] CM. SHORTER THAN . . . . . [7] STANDARD CULTIVAR
[ ] CM. LONGER THAN . . . . . [ ] STANDARD CULTIVAR
[0.7] MM. NARROWER THAN . . . . . [8] STANDARD CULTIVAR
[0.1] MM. WIDER THAN . . . . . [7] STANDARD CULTIVAR

[ ] FLAG LEAF AT BOOT STAGE: 1 = DEFLEXED 3 = RECURVED 5 = HORIZONTAL 7 = SEMI-ERECT 9 = ERECT

STANDARD CULTIVARS

1 = GULF 2 = WIMMERA 62 3 = LINN 4 = PELO
5 = NORLEA 6 = ABERYSTWYTH S-23 7 = MANHATTAN 8 = PENNFINE

9. LEAVES:

[3] VERNATION: 1 = LEAVES ROLLED IN YOUNG SHOOTS
2 = LEAVES SEMI-ROLLED (folded with rolled edges)
3 = LEAVES FOLDED IN YOUNG SHOOTS

[100] % PLANTS WITH ANTHOCYANIN IN LOWER LEAF SHEATH

[3] FOLIAGE COLOR: 1 = YELLOW GREEN 2 = MEDIUM GREEN 3 = BLUE GREEN

10. SPIKE:

[221] MM. SPIKE LENGTH (tip to internode below lowest floret)

[14] MM. SHORTER THAN ..... [8]

[ ] MM. LONGER THAN ..... [ ]

} USE STANDARD CULTIVARS FROM ABOVE

[2800] MG. PER TEN SPIKES (trimmed to internode below lowest floret)

[ ] MG. LIGHTER PER TEN SPIKES THAN ..... [ ]

[200] MG. HEAVIER PER TEN SPIKES THAN ..... [8]

} USE STANDARD CULTIVARS FROM ABOVE

[10.3] FLORETS PER SPIKELET

PERCENTAGE OF PLANTS WITH:

RACHIS: [ ] % SMOOTH [ ] % ROUGH

SPIKE COLOR: [70] % GREEN [30] % PURPLE

LEMMA: [0] % AWNED [ ] MM. AWN LENGTH

[7.6] MM. GLUME LENGTH

[ ] 1 = SPIKELET LENGTH NEARLY EQUAL TO OUTER GLUMES
2 = SPIKELET LENGTH MUCH LONGER THAN OUTER GLUMES

11. COLEOPTILE:

[100] % PLANTS WITH ANTHOCYANIN IN COLEOPTILE

12. ANTHER COLOR:

[0] % PLANTS WITH WHITE ANTHERS

[90] % PLANTS WITH YELLOW ANTHERS

[10] % PLANTS WITH PURPLE ANTHERS

13. ROOT AND PLANT CHARACTERS:

[100] % PLANTS WITH PROSTRATE GROWTH HABIT

[0] % PLANTS WITH FLUROESCENT ROOTS

[0] % PLANTS WITH UPRIGHT GROWTH HABIT

14. SEED:

[1510] MG. PER 1,000 SEED

[52.4] MM. TOTAL LENGTH OF 10 SEEDS

[12.3] MM. TOTAL WIDTH OF TEN SEEDS

15. DISEASE (0 = NOT TESTED, 2 = HIGHLY SUSCEPTIBLE, 4 = MODERATELY SUSCEPTIBLE, 6 = MODERATELY RESISTANT, 8 = HIGHLY RESISTANT):

4	CROWN RUST (Puccinia coronata)	0	DOLLAR SPOT (Sclerotinia)	6	BROWN PATCH (Rhizoctonia)
6	LEAF SPOT (Helminthosporium)	8	MILDEW	0	OTHER *(Specify)*
0	SNOW MOLD (Typhula)	0	RED THREAD (Corticium)		

16. INSECT (0 = NOT TESTED, 2 = HIGHLY SUSCEPTIBLE, 4 = MODERATELY SUSCEPTIBLE, 6 = MODERATELY RESISTANT, 8 = HIGHLY RESISTANT):

0 *(Specify)* _____

17. GIVE RESEMBLANCE VALUE IN LEFT COLUMN AND VARIETY CODE NUMBER IN RIGHT COLUMN FOR VARIETY WITH WHICH COMPARISON IS MADE (1 = LESS THAN, 2 = SAME AS, 3 = MORE ERECT, MORE RESISTANT, DENSER, MORE PERSISTENT, DARKER OR GREATER HEIGHT.):

RESEMBLANCE	CHARACTER	SIMILAR VARIETY	
1	PLANT HABIT (erectness)	8	1 = GULF
3	TILLERING	8	2 = WIMMERA 62
3	WINTER HARDINESS	8	3 = LINN
3	HIGH TEMP. STRESS RESISTANCE	7	4 = PELO
2	TURF PERSISTENCE	8	5 = NORLEA
2	PLANT COLOR	8	6 = ABERYSTWYTH S-23
2	VERTICAL SEEDLING GROWTH RATE	7	7 = MANHATTAN
3	CROWN DENSITY	8	8 = PENNFINE
2	MOWER SHREDDING RESISTANCE	8	

18. GIVE AREA OF ADAPTATION AND INTENDED USE: New Jersey and surrounding areas

19. GIVE AREA TEST RESULTS PRESENTED FROM: New Jersey, Oregon

COMMENTS:

FILED
IN THE OFFICE OF THE
SECRETARY OF STATE OF THE
STATE OF NEVADA

NOV 24 1999

No. C 7946-89

Dean Heller
DEAN HELLER, SECRETARY OF STATE

ARTICLES OF MERGER
OF
E. F. BURLINGHAM & SONS
INTO
AGRIBIOTECH, INC.

Pursuant to the provisions of N.R.S. §92A.180 and N.R.S. § 92A.200, AgriBioTech, Inc., a Nevada corporation, hereby submits these Articles of Merger for the purpose of merging E. F. Burlingham & Sons, an Oregon corporation and wholly-owned subsidiary of AgriBioTech, Inc., into AgriBioTech, Inc.

ARTICLE I.
Corporations Proposing to Merge and Surviving Corporation

The name of the merging corporation is E. F. Burlingham & Sons, an Oregon corporation (hereinafter called the "Subsidiary Corporation"); and the name of the corporation which shall be the surviving corporation is AgriBioTech, Inc., a Nevada corporation (hereinafter called the "Parent Corporation").

ARTICLE II.
Adoption of Plan of Merger

The Plan of Merger set forth in Article IV was duly adopted by the Parent Corporation and the Subsidiary Corporation.

ARTICLE III.
Approval by Shareholders

Pursuant to N.R.S. § 92A.180, neither the approval of the Shareholders of the Parent Corporation, nor the approval of the Shareholders of the Subsidiary Corporation was required.

ARTICLE IV.
Plan of Merger

The following Plan of Merger was duly approved on November 15, 1999, in the manner prescribed by law with respect to each of the corporations participating in the Merger:

Section 1. Corporations Proposing to Merge and Surviving Corporation. The name of the merging corporation is E. F. Burlingham & Sons, an Oregon corporation (hereinafter called the "Subsidiary Corporation"); and the name of the corporation which shall be the surviving corporation is AgriBioTech, Inc., a Nevada corporation (hereinafter called the "Parent Corporation").

Section 2. Effective Time of Merger. The effective time of the merger shall be November 29, 1999 at 11:59 p.m. E.S.T. (the "Effective Time").

Section 3. Effects of Merger. The Merger shall have the effects set forth in N.R.S. § 92A.250.

Section 4. Conversion of Shares. Each share of capital stock of the Subsidiary Corporation issued and outstanding at the Effective Time shall, as of the Effective Time, by virtue of the Merger and without any action on the part of the holder thereof, be canceled and extinguished without consideration given therefor. The shares of capital stock of the Surviving Corporation shall continue to be outstanding without change.

Section 5. Articles of Incorporation and Bylaws. The Articles of Incorporation and the Bylaws of the Surviving Corporation as in effect immediately prior to the Effective Time shall become the Articles of Incorporation and Bylaws of the Surviving Corporation following the Effective Time until changed in accordance with their terms and applicable law.

[Signature page to follow]

This the 15th day of November, 1999.

AGRIBIOTECH, INC., a Nevada corporation

By: _____
Randy Ingram, Executive Vice President

By: _____
Douglas A. Fisher, Secretary

SURVIVOR

715248-89

FILED

NOV 2 4 1999

OREGON
SECRETARY OF STATE

ARTICLES OF MERGER OF
E.F. BURLINGHAM & SONS
INTO
AGRIBIOTECH, INC.

Pursuant to the provisions of Sections 60.491 and 60.501 of the Oregon Revised Statutes ("ORS"), AgriBioTech, Inc., a Nevada corporation, hereby submits these Articles of Merger for the purpose of merging E.F. Burlingham & Sons, an Oregon corporation and wholly-owned subsidiary of AgriBioTech, Inc., into AgriBioTech, Inc. (the "Merger").

ARTICLE I
Plan of Merger

The following Plan of Merger was duly adopted on November 15, 1999, in the manner prescribed by law with respect to each of the corporations participating in the Merger:

Section 1. Names. The name of the subsidiary corporation and merging corporation is E.F. Burlingham & Sons, an Oregon corporation (the "Subsidiary Corporation"). The name of the parent corporation and surviving corporation is AgriBioTech, Inc., a Nevada corporation (the "Parent Corporation").

Section 2. Effective Time of Merger. The effective time of the Merger shall be November 29, 1999 at 11:59 p.m. E.S.T. (the "Effective Time").

Section 3. Merger. The Subsidiary Corporation shall be merged with and into the Parent Corporation and the Parent Corporation shall be the surviving corporation.

Section 4. Conversion of Outstanding Stock. Each share of capital stock of the Subsidiary Corporation issued and outstanding at the Effective Time shall, as of the Effective Time, by virtue of the Merger and without any action on the part of the holder thereof, be canceled and extinguished without consideration given therefor. The shares of capital stock of the Surviving Corporation shall continue to be outstanding without change.

Section 5. Effects of Merger. The Merger shall have the effects set forth in ORS Section 60.497.

ARTICLE II
Shareholder Approval

The Parent Corporation is the owner of all of the outstanding shares of each class of the Subsidiary Corporation's stock. In accordance with ORS Section 60.491, shareholder approval of the Plan of Merger by one or more corporations party to the Merger is not required.

ARTICLE III
Contact

The person to contact regarding this filing is Anne L. Barragar, Esq., whose telephone number is (503) 778-5319.

[Signature page to follow]

The undersigned declares the facts herein stated are true as of the 15th day of November, 1999.

AGRIBIOTECH, INC.

By: _____

Name: Randy Ingram
Title: Executive Vice President

U.S. DEPARTMENT OF AGRICULTURE
Plant Variety Protection Office

RECORDATION FORM COVER SHEET
PVP CERTIFICATES ONLY

To the Acting Commissioner of the Plant Variety Protection Office. Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

E. F. Burlingham & Sons

☐ Individual(s) ☐ Association
☐ General Partnership ☐ Limited Partnership
☒ Corporation - State **Oregon**
☐ Other

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

2. Name and address of receiving party(ies):

Name: **BANKAMERICA BUSINESS CREDIT, INC.**

Street Address: **55 South Lake Avenue, Suite 900**

City: **Pasedena** State: **California**
ZIP: **91101**

☐ Individual(s) citizenship
☐ Association
☐ General Partnership
☐ Limited Partnership
☒ Corporation-State **Delaware**
☐ Other

If assignee is not domiciled in the United States, a domestic representative designation is attached: ☐ Yes ☐ No
(Designation must be a separate document from Assignment)
Additional name(s) & address(es) attached? ☐ Yes ☒ No

3. Nature of conveyance:

☐ Assignment ☐ Merger
☒ Security Agreement ☐ Change of Name
☐ Other
Execution Date: **June 23,1998**

4. PVP certificate identifying information:

A. PVP No.: **8000101**

B. Date certificate issued or application filed: **02/27/84**

C. Variety: **"BELLE" Ryegrass, perennial**

Additional numbers attached? ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:
Name: **Tamsen Valoir**
Jenkens & Gilchrist
Internal Address:

Street Address: **1445 Ross Avenue, Suite 3200**
City: **Dallas** State: **Texas** Zip: **75202-2799**

6. Total number of PVP applications or certificates involved: 1

7. Total fee (37 CFR 3.41): $ **25.00**

☒ Enclosed
☐ Authorized to be charged to deposit account.

8. Deposit Account number:

(Attach duplicate copy of this page if paying by deposit account)

DO NOT USE THIS SPACE

9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Tamsen Valoir — Name of Person Signing
Signature
July 1, 1998 — Date

Total number of pages comprising cover sheet: 1

PVP CERTIFICATE SECURITY AGREEMENT

WHEREAS, E. F. BURLINGHAM & SONS, an Oregon corporation ("Assignor"), having a business address of 1936 19th Avenue, Forest Grove, OR 97116 is the owner of the issued Plant Protection Act (PVP) certificate(s) listed below; and

WHEREAS, BankAmerica Business Credit, Inc., a Delaware corporation, having an office at 55 South Lake Avenue, Suite 900, Pasadena, California 91101 as "Agent" for the "Lenders" as defined and described in the Loan and Security Agreement dated as of June 23, 1998 ("Assignee"), is desirous of acquiring a SECURITY INTEREST in such PVP certificate(s);

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, said Assignor does hereby sell, assign, transfer and set over unto the said Assignee a SECURITY INTEREST in, to, and under the PVP certificate(s):

No. 8000160 Issued
No. 8000101 Issued

E. F. BURLINGHAM & SONS

By: _____
Printed Name: Henry A. Ingalls
Title: Vice President

STATE OF TEXAS §
§
COUNTY OF DALLAS §

Henry A. Ingalls, Vice President, of E. F. BURLINGHAM & SONS, personally appeared before me, and being first duly sworn declared that he signed the security agreement in the capacity designated, and further states that he has read the above security agreement, and the statements therein contained are true.

SUBSCRIBED AND SWORN TO before me this 23 day of June, 1998.

_____
Notary Public in and for the State of Texas

My Commission Expires:

_____

_____
Printed Name

Gregory J. Hausdorf
Notary Public, State of Texas
My Comm. Expires 08/19/00

FINS2DAL:57328.1 20992-00039

UNITED STATES DEPARTMENT OF AGRICULTURE
PLANT VARIETY PROTECTION OFFICE

CERTIFICATE OF MAILING

BOX ASSIGNMENT
Acting Commissioner of the Plant Variety Protection Office
Plant Variety Protection Office
10301 Baltimore Blvd.
Beltsville, MD 20705-2351.

Dear Sir:

I hereby certify that this correspondence,

74 Cover sheets
74 Assignments
Check in the amount of $1,850.00 (74 x $25.00)
74 Return postcards

for the attached (in Exhibit A) PVP certificate numbers are being deposited with the United States Postal Service as Express Mail, mailing label number EE507465254US, postage prepaid, in an envelope addressed to:

BOX ASSIGNMENT
Acting Commissioner of the Plant Variety Protection Office
Plant Variety Protection Office
10301 Baltimore Blvd.
Beltsville, MD 20705-2351.

Tamsen Valoir

Date: July 1, 1998

IPHOU:15412.1 20992-00039

Jenkens & Gilchrist
A PROFESSIONAL CORPORATION
1100 LOUISIANA STREET, SUITE 1800
HOUSTON, TEXAS 77002

TEXAS COMMERCE BANK, N.A.
301 W. BEAUREGARD
SAN ANGELO, TEXAS 76903

903870

DATE	AMOUNT
July 1, 1998	*$1,850.00*

AY *One Thousand Fifty Dollars and 00 Cents*

TO THE ORDER OF U. S. Department Of Agriculture
Plant Variety Protection Office

TWO SIGNATURES REQUIRED OVER $2500
VOID AFTER 180 DAYS
NOT VALID FOR OVER $5000

⑈090387⓪⑈ ⑆111300880⑆ ⑈0630000965⑃